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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/330,417 | 06/11/1999 | EDWARD K. PAVELCHEK | 50369 | 9393 |

7590 09/12/2002

PETER F CORLESS ESQ
130 WATER STREET
BOSTON, MA 02109

EXAMINER

KORNAKOV, MICHAIL

| ART UNIT | PAPER NUMBER |
|----------|--------------|
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1746

18

DATE MAILED: 09/12/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

mx-18

Office Action Summary

Application No.

09/330,417

Applicant(s)

PAVELCHEK, EDWARD K.

Examiner

Michael Kornakov

Art Unit

1746

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 August 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,4-12,14-17,20 and 24-33 is/are pending in the application.
- 4a) Of the above claim(s) 26 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,4-12,14-17,20 and 24-33 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 1,4-12,14-17,20 and 24-33 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 13.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Continued Prosecution Application

1. The request filed on 08/26/2002 for a Continued Prosecution Application (CPA) under 37 CFR 1.53(d) based on parent Application No. 09/330,417 is acceptable and a CPA has been established. An action on the CPA follows.
2. Cancellation of claims 13, 18 and 19 in Paper No. 16 is acknowledged. Rejections under 35 USC 112, second paragraph of claims 1, 4-17 are withdrawn in view of Applicants' statement that the term is clear from the specification. Although, Examiner's position is that the term should be " moles of atoms of inorganic compounds (or inorganic elements), Applicants are entitle to be their own lexicographers.
3. Rejections of claims 13, 18 and 19 under 35 USC 112, second paragraph are withdrawn in view of cancellation of the above claims.
4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
5. Claims 1 and 30-33 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 30-33 depend on claim 18, which has been cancelled by Applicant. It is not clear which claim the indicated claims 30-33 depend upon.

Art Unit: 1746

In this Office Action claims 30-33 are treated as being dependent on claim 1.

Claim 1 recites the limitation "the resin". There is insufficient antecedent basis for this limitation in the claim.

6. Claims 1, 4-11, 15-17 and 24, 25, 27-29 stand rejected and newly added claims 31-33 are rejected under 35 U.S.C. 102(e) as being anticipated by Pavelchek et al. (U.S. 5,939,236), as per reasons clearly stated in the final Office Action on the merits, paper No. 11.

Pavelchek provides methods for forming a photoresist relief image on substrates coated with antireflective compositions (hard masks) (col.5, lines 23-25) utilizing the following steps: providing dielectric substrate, such as silicone dioxide (col.14, line 34); depositing by spin coating (col. 14, line 27) a layer of antireflective composition on a substrate (col. 14 lines 27-29), the antireflective composition comprises photoacid generators which may employ halogen complex of divalent to heptavalent metals, for example Al (col.6, lines 46-48), which represents Group IIIa; depositing photoresist over the cured layer of antireflective coating (col. 14, lines 42-43); exposing photoresist to activating radiation (col. 14, lines 63-67) and developing photoresist (col. 15, line 23) to produce a patterned image over antireflective layer; etching areas, bared from photoresist, particularly, removing crosslinked antihalation (antireflective) coating layer by oxygen plazma etching and selectively processing bared substrate areas (col. 15, lines 36-42).

Art Unit: 1746

Pavelchek further discloses the use of aromatic polycyclic or heterocyclic compounds with optionally substituted anthracyl, phenanthryl, naphthyl and other groups (col. 7, lines 22-35) and wavelength exposure at 193 nm or 248 nm (col.4, line 62; Examples 3 and 4).

Pavelchek also teaches the use of a thermal acid generator as the part of antireflective composition (col. 11, lines 5-8).

7. Claims 12 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pavelchek et al (U.S. 5,939,236) in view of Grill (In the book "Plasma in Materials Fabrication", page 224, 5-th paragraph).

While disclosing the process and the antireflective aluminum containing hard mask composition utilized in this process, Pavelchek does not specifically indicates the use of plasma **halide** for etching his antireflective hard mask layer as per instant claims 12 and 20. However, Pavelchek himself provides a clear motivation for use any **suitable** plasma gas etch in his process (col. 15, line 40-41).

Grill teaches that most materials, utilized in manufacturing of large scale integrated circuits and among them Al, can be dry etched with halogen plasma species to form volatile compounds (page 224, 5-th paragraph).

Because both Pavelchek and Grill are concerned with plasma processing of aluminum containing structures and Grill provides for plasma dry etch of aluminum, utilizing halogen species, one skilled in the art would have found it obvious to utilize halogen plasma species of Grill for etching aluminum containing layer of Pavelchek in order to form easily removable volatile etch products of aluminum, thus eliminating the

Art Unit: 1746

presence of after etch residues in the process of Pavelchek and thus arriving at the subject matter as instantly claimed.

8. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pavelchek et al (U.S. 5,939,236) in view of JP'40624428.

The teaching of Pavelchek does not specifically indicates that the resin matrix of the ARC contains silicon atoms. However, Pavelchek indicates that variety of different resins can be utilized for obtaining the ARC composition (col.9, lines 59-65), thus providing motivation to the skilled artisan to utilize different resin matrix for ARC layers. Si containing resins are widely utilized in the art, as provided, for example, by JP'428. Since the instant application does not emphasizes the criticality of using particular resin, a skilled artisan would have found it obvious to utilize a Si resin among others as a matrix for ARC layer of Pavelchek with the reasonable expectation of success.

9. Applicant has **NOT** provided evidence on the record, showing that the invention was owned by, or subject to an obligation of assignment to, the same entity as U.S.D. Patent 5,939,236 **at the time this invention was made**. Accordingly, U.S. 5,939, 236 **cannot** be disqualified as prior art through 35 U.S.C. 102(e), (f) or (g) in any rejection under 35 U.S.C. 103(a) in this application.

Response to Arguments

10. Applicant's arguments filed August 26, 2002 have been fully considered but they are not persuasive. The crux of Applicant's argument appears to hinge on the disclosure

Art Unit: 1746

of Pavelchek, allegedly containing "very small" amounts of PAG compounds, different than in the present claim 1.

With all due respect to Applicants opinion, Applicant's attention is drawn to the fact that NO amount or even NO PAG at all is claimed in the instant claim 1. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., amount of photoacid generator , PAG) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

In response to next Applicant's argument with regard to claim 24 that Pavelchek does not disclose a composition having an inorganic substitution, Applicants' attention is drawn to column 6, lines 43-56, which explicitly teach the presence of inorganic elements.

Furthermore, all rejections applied to the instant claim 1 are applicable to claim 24, since claim 24 is even broader than claim 1 (does not indicate the molar amount of "inorganic atoms").

In response to Applicants' argument that Pavelchek's disclosure provides "very small" amounts of PAG, it is noted here and above that neither the instant claims, nor the instant specification provide any recitation of the amount of PAG in a composition. Therefore, Applicants arguments are more specific than the claims.

Art Unit: 1746

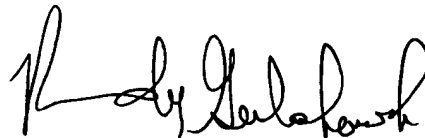
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Kornakov whose telephone number is (703) 305-0400. The examiner can normally be reached on 9:00am - 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on (703) 308-4333. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872 9310 for regular communications and (703) 872 9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308 2450.

Michael Kornakov
Examiner
Art Unit 1746

MK
September 7, 2002


RANDY GULAKOWSKI
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700